

CRUISE REPORT

NT11-05

“Deep Tow” & “Natsushima”



May 2011

Earthquake and Tsunami Research Project
for Disaster Prevention

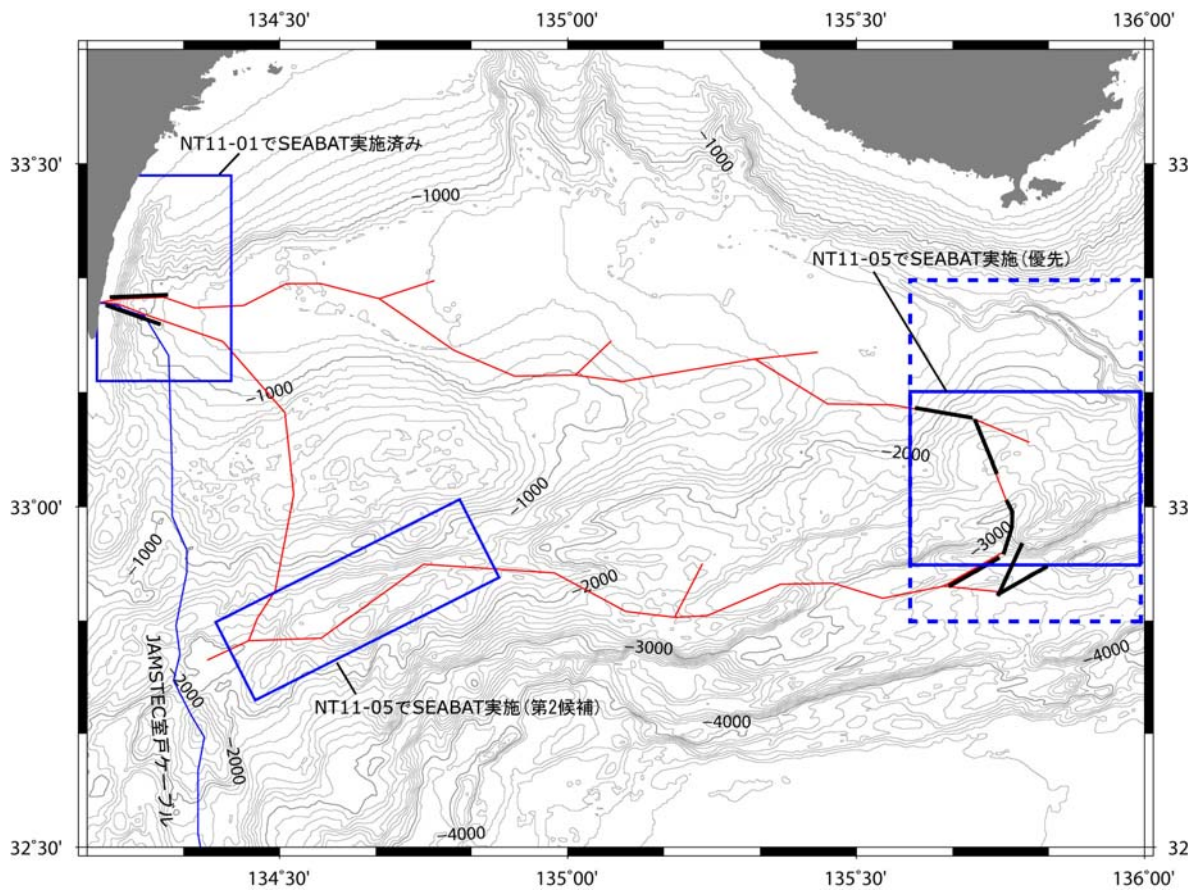
JAMSTEC

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1. Introduction

The present survey aims two objectives, one is route clearance for DONET1 off Kumano and the other is route survey for DONET2 off Kii-suido. Planned back-bone cable route is shown in the figure below. We focus on the blue box in the figure because complicated topography is expected. In the present survey we tried to check the back-bone cable route by using “Deep Tow” camera system and obtain the bathymetry data.



2. Schedule

Actual schedule of the NT11-05 cruise was summarized in Table 1. Our cruise started from JAMSTEC and returns to JAMSTEC via Kumano-nada and off Kii-channel in order to carry out “Deep-Tow” survey and multi-beam bathymetric survey. Ten dives were carried out, in which 4 dives in Kumano-nada, 4 dives in off Shionomisaki, and 1 dive in off Muroto-cape. On the period of 1 May to 5 May, Hiroyasu Momma joined the cruise as an advisory researcher.

Table 1 Schedule of NT11-05 cruise

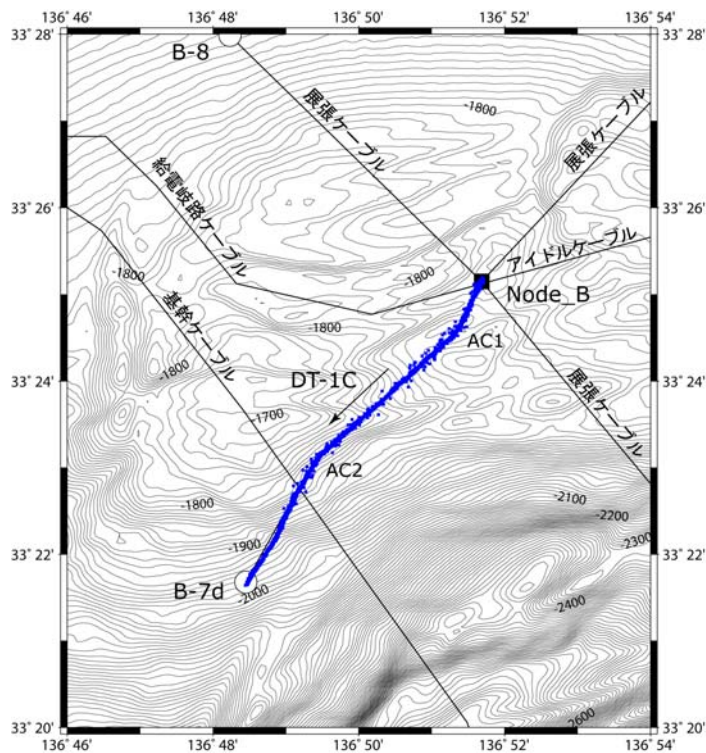
Date	Area at noon	Operation	Remarks
21 April		Departure	9:00 departed from JAMSTEC
22 April	Kumano-B	“DeepTow” survey (DT-1C)	B-7
23 April	Owase		Evacuation due to the bad weather
24 April	Kumano-D	“Deep Tow” survey (DT-2C)	D-13 > D-15 via Node D
25 April	Off Shionomisaki	“Deep Tow” survey (DT-3C)	Near Node-2D
26 April	Off Shionomisaki	“Deep Tow” survey (DT-4C)	Near AC11
27 April	Off Muroto	Maintenance	
28 April	Off Muroto	“Deep Tow” survey (DT-5C)	Cable landing site
29 April	Off Shionomisaki	“Deep Tow” survey (DT-6C)	Main cable (AC14>Node_2E)
30 April	Off Shionomisaki	“Deep Tow” survey (DT-7C)	Main cable (AC14>AC12)
1 May	Off Kumano	“Deep Tow” survey (DT-8C)	Route clearance (around Node A)
2 May	Off Kumano	“Deep Tow” survey (DT-9C)	Route clearance (Node A > A-1c)

3 May	Off Shionomisaki	“Deep Tow” survey (DT-10C)	Extension cable (Node_2E>2E-18)
4 May	Suruga trough	No.1 cable free fall	
5 May		Arrive	9:30 arrived at JAMSTEC

3. “Deep-Tow” Survey

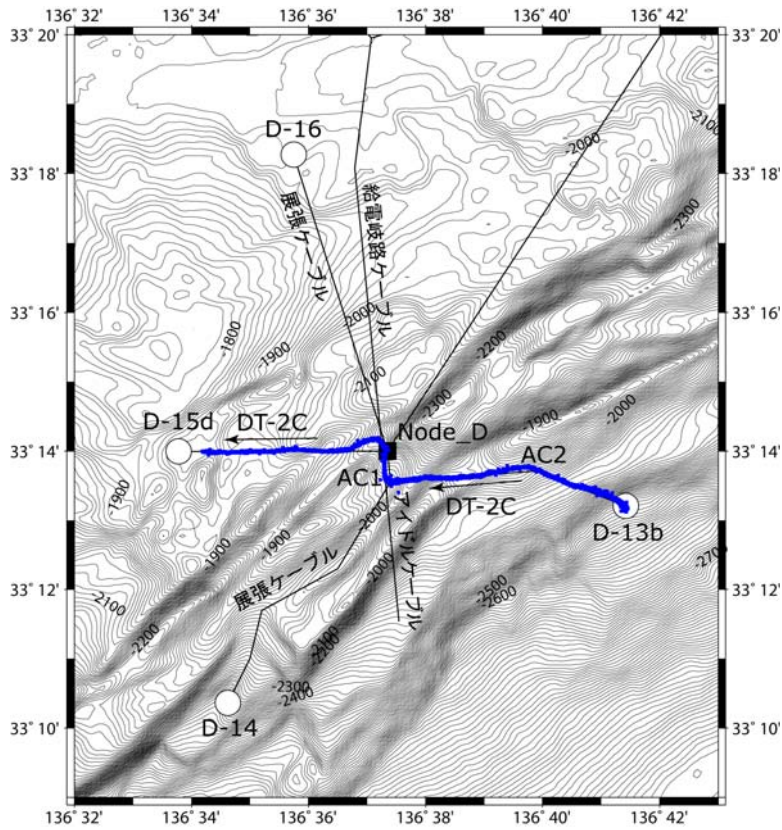
(1) DT-1C

DT-1C survey was carried out in order for route clearance between the science node B and the observatory B-7. There are two way points AC1 and AC2 on the survey line. There are no obstacles on the way of the survey line, therefore “Hyper-Dolphin” will operate cable laying.



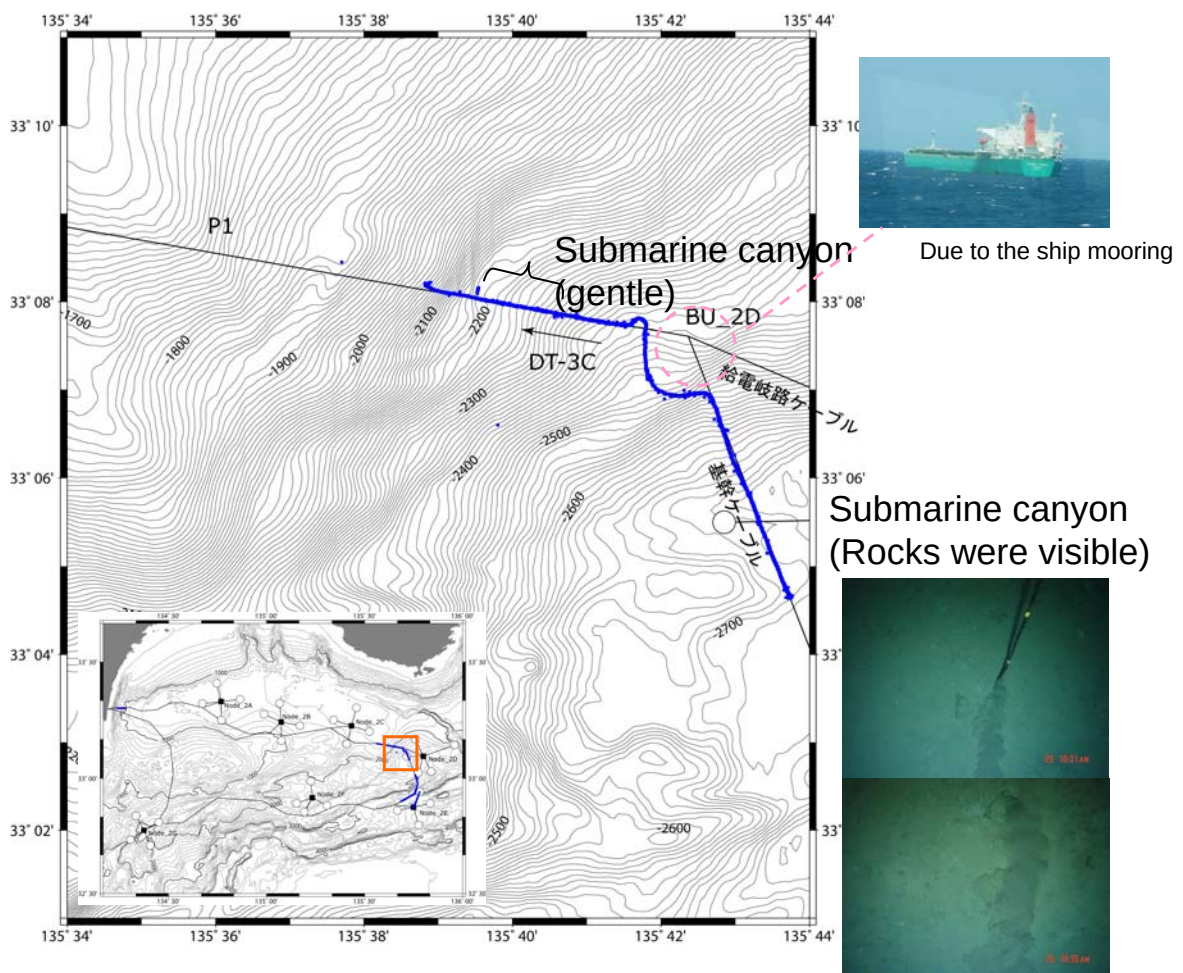
(2) DT-2C

DT-2C survey was done two extension cable routes in the D area. The survey line started at the observatory D-13, then passed the science node D, and finally approached the observatory D-15. Because no obstacles were found during the survey, route clearance was completed.



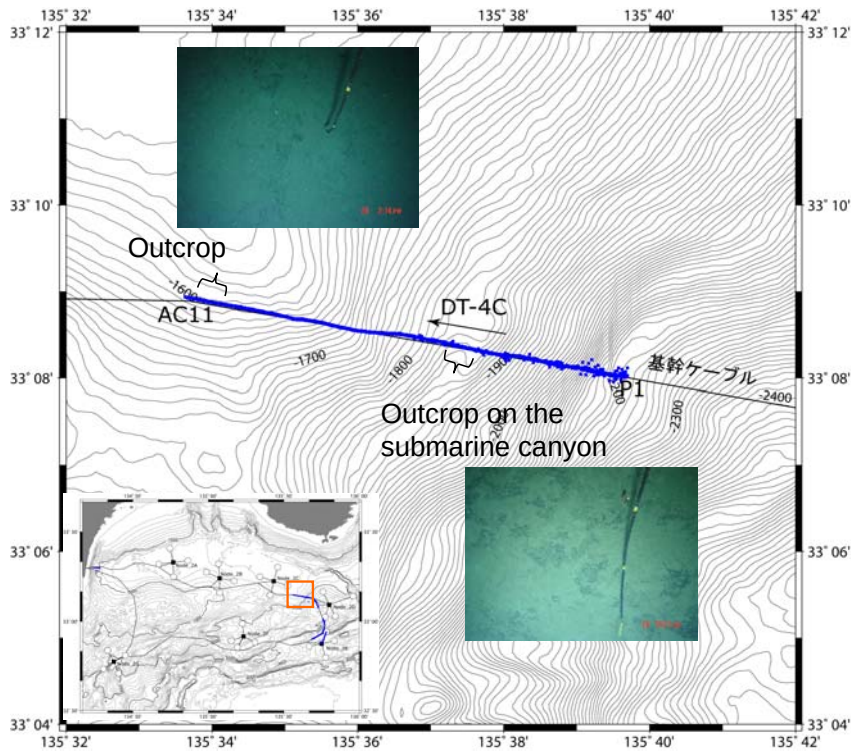
(3) DT-3C

Route survey for DONET2 construction was started after DT-3C survey. The first survey was carried out along the back-born cable route near the branching unit BU2D. On the way of the submarine canyon, rock gravels were found, which is not so big problems to the cable route. Another submarine canyon exists, but it is very gentle. Generally, this section can be used as the back-bone cable route.



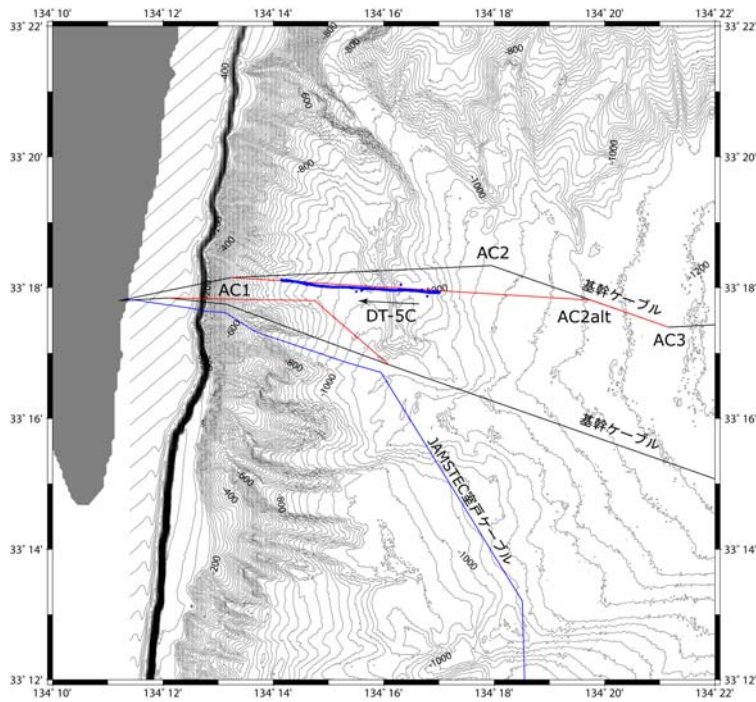
(4) DT-4C

DT-4C was followed by the DT-3C survey. Outcrop sections were found along the submarine canyons, which do not affect back-bone cable.



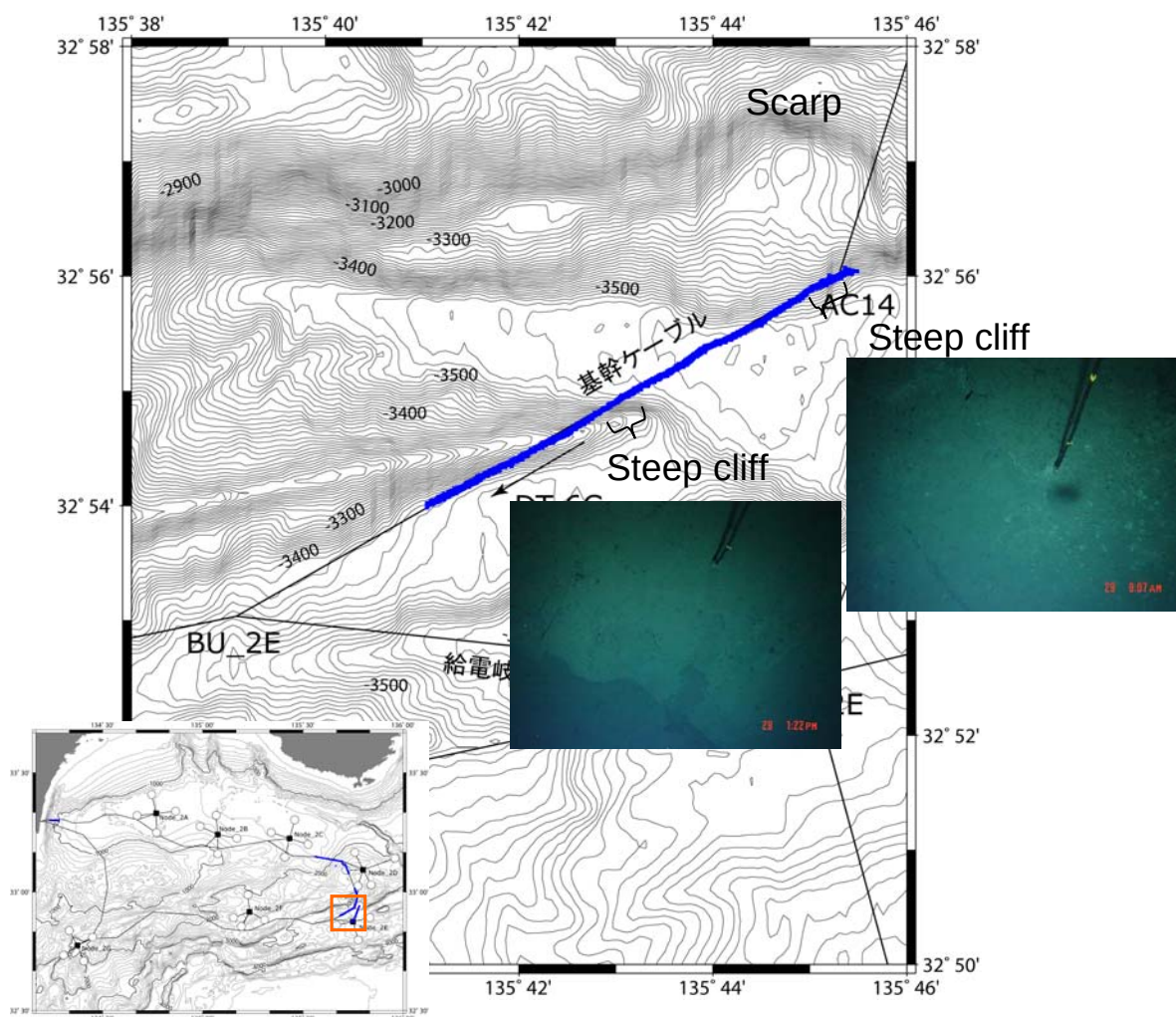
(5) DT-5C

After fixing No.1 cable, a shallow area survey near the landing point was conducted. Ridge exists crossing the back-bone cable, we have to check the cable route carefully in this area. We surveyed from water depth of 1000 meters to 600 meters as shown in the figure below. No cliffs on the way along the surveyed line.



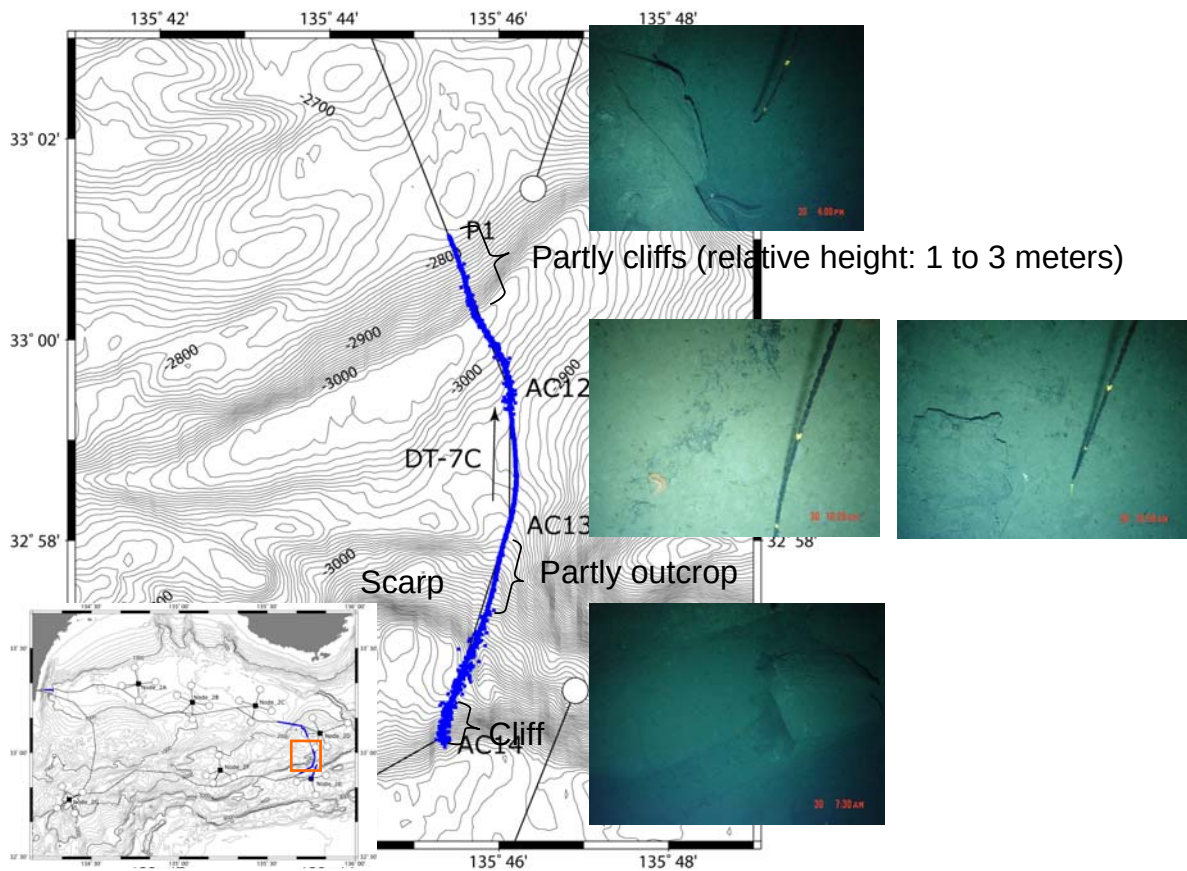
(6) DT-6C

DT-6C survey was done off Shiono-misaki, where the back-bone cable runs along the Nankai Trough. Enlarged topography gives us an information of scarp cliff at the way point of AC14. We found that steep cliff at the down stream of the scarp cliff. Planned back-bone cable runs crossing the ridge, where we found steep cliff. We had better reconsider that the back-bone cable route, if we can obtain high resolution topography.



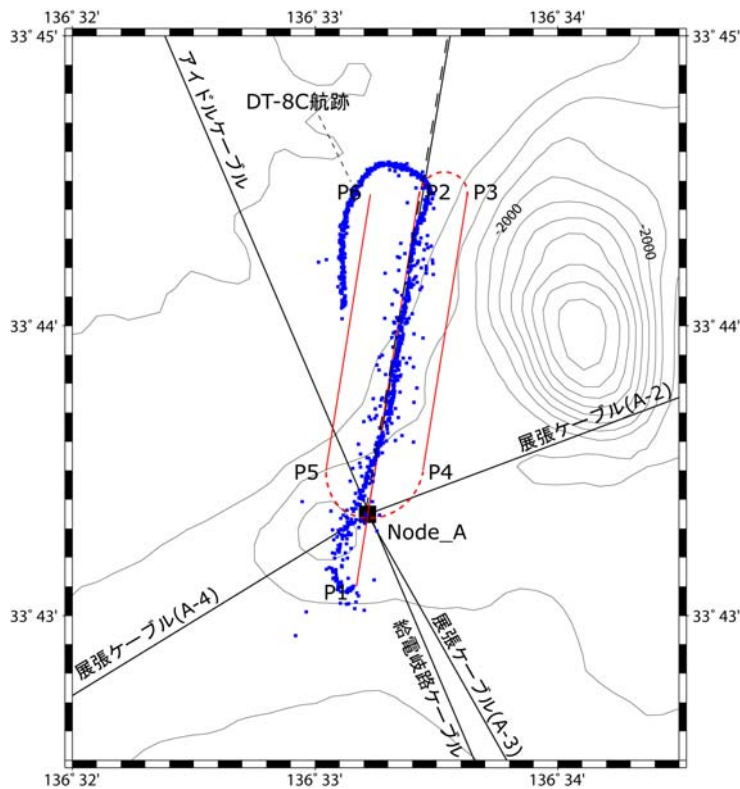
(7) DT-7C

DT-7C continued from the DT-6C survey line, i.e., northern part of DT-6C survey line. As we experienced that we found steep cliffs near the scar at AC14, steep cliff exists either on the DT-7C line. We need to refine the back-bone cable route after obtaining detailed topography data.



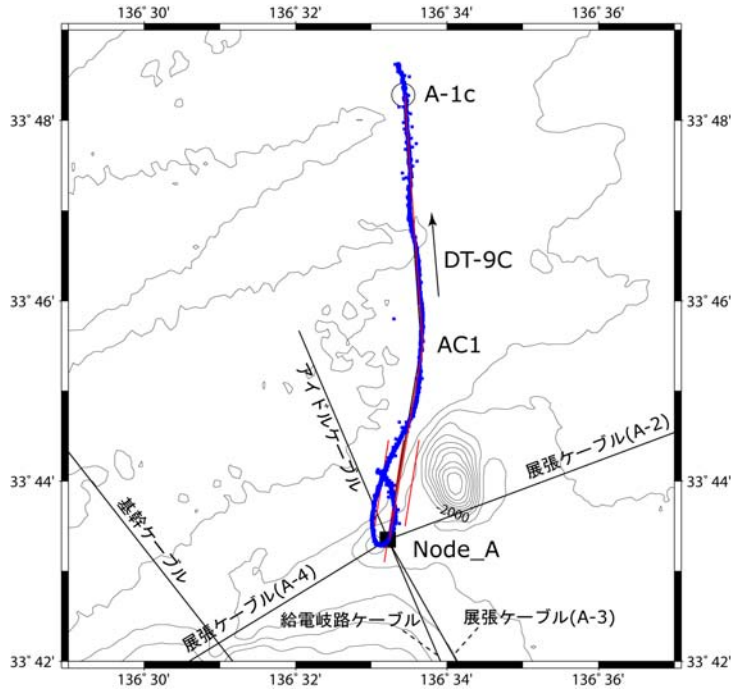
(8) DT-8C

The present DT-8C survey was done in order for check the safety for the extension between the science node A and the observatory A-1. During the KY10-15 cruise, “Hyper-Dolphin” was captured by something in the sea, but no obstacles were recovered. Immediately before “Hyper-Dolphin” dive, we planned to do route clearance near Node_A. We prepared three survey lines, but we could perform one and a half lines due to the bad weather condition. Survey lines left would be completed in the following days.



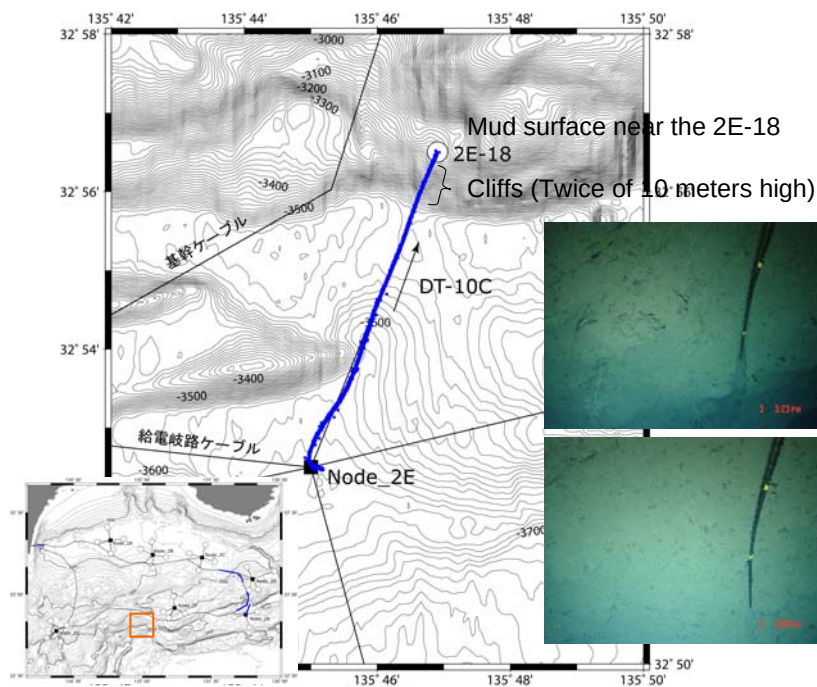
(9) DT-9C

This DT-9C survey was a continuous route clearance of DT-8C survey line. Due to the current and windy weather, we had to change lines near the Node_A. After route clearance near the Node_A, we complete route clearance until the observatory A-1. No obstacles was found on the way both of DT-8C and DT-9C survey lines.



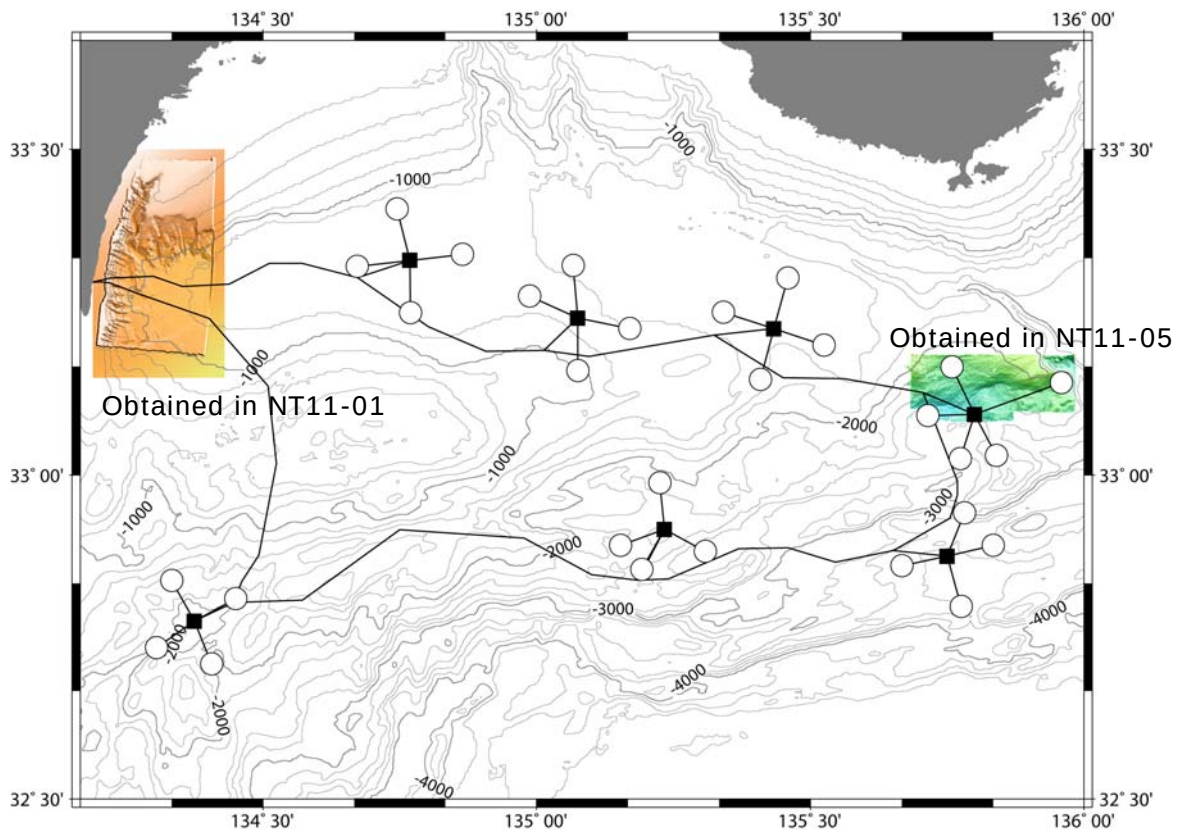
(10) DT-10C

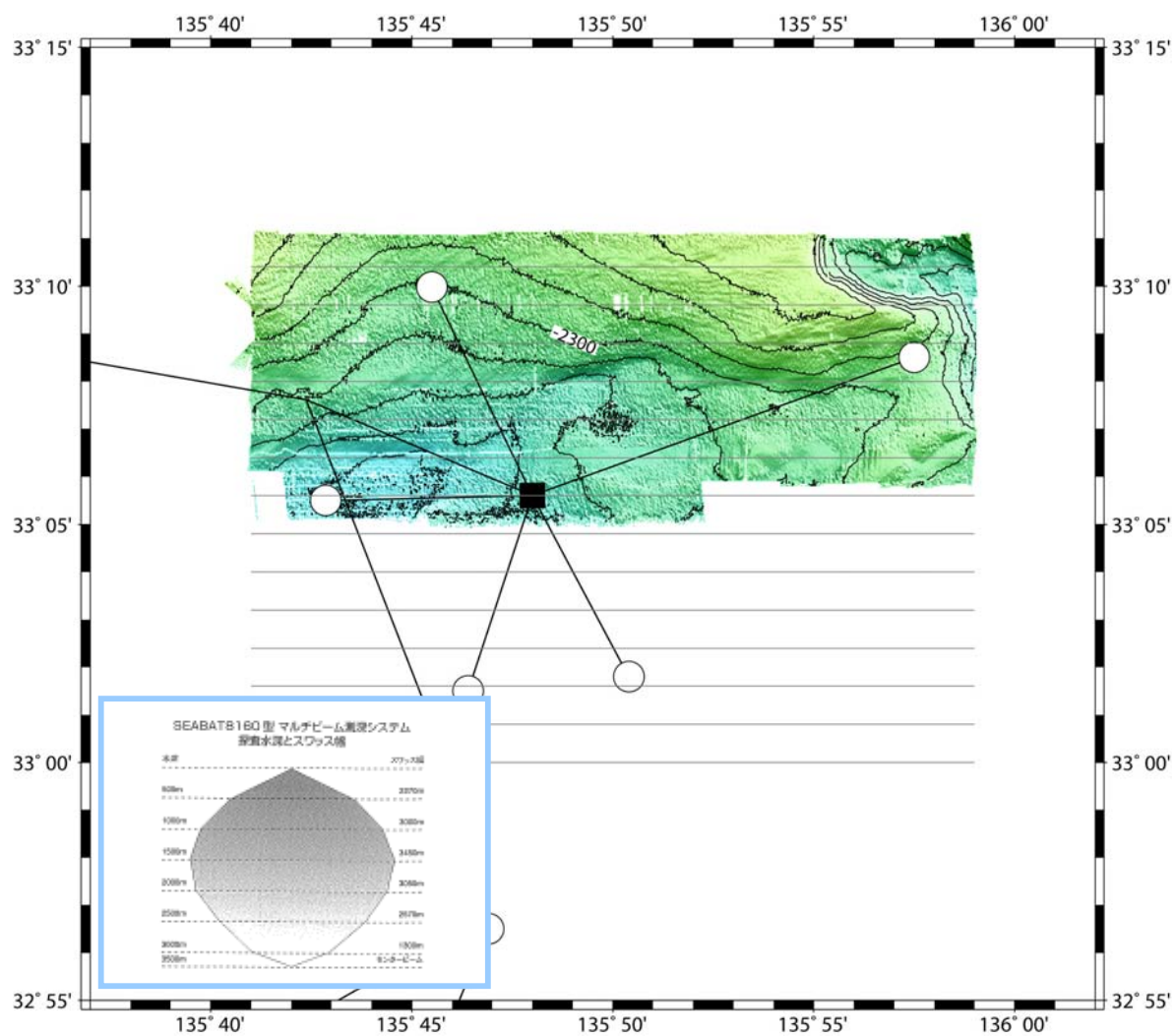
This is the last survey of NT11-05 cruise, which surveyed the extension cable route between Node_2E and the observatory 2E-18. It is obvious that the observatory 2E-18 is located top of the slope, we found the cliffs twice on the extension cable route. We had better move the observatory downstream of the slope.



4. Multi-beam Bathymetry Survey

In the night of the NT11-05 cruise, we obtained bathymetry data by multi-beam echo sounder system "SEABAT8160" equipped with R/V "Natsushima". In January, we have obtained the bathymetry data near the landing station. We tried to obtain offshore area, where the topography seems complicated. Because of narrow foot-print width of SEABAT8160 system, we could obtain a little area near the Node_2D. Detailed bathymetry obtained in the present survey is also shown in the next page.





4. Concluding Remarks

The present NT11-05 cruise performed that the route clearance for DONET1 construction and the pre-survey of the back-bone cable and the extension cable for DONET2. No problem for ROV dives was found for DONET1 constructions. As for the DONET2 back-bone cable route, some modifications are necessary.

At the end of the report of NT11-05 cruise, we would like to express our best thanks to all crew of R/V "Natsushima" and also to all member of "Deep Tow" operation team.